Exelon Generation

10CFR50.73

LG-16-083
July 27, 2016

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Limerick Generating Station, Unit 2
Renewed Facility Operating License No. NPF-85
NRC Docket No. 50-353

Subject: LER 2016-001-00, Manual Actuation of the Reactor Protection System

This Licensee Event Report (LER) addresses a manual actuation of the reactor protection system (RPS) following a trip of both reactor recirculation pumps. The pump trips occurred during testing of a modification to the Plant Process Computer (PPC). The manual scram was directed by the unexpected/unexplained change in core flow procedure (OT-112) due to the tripping of the reactor recirculation pumps at power. An error in the modification wiring design caused an actuation of the reactor recirculation pump trip relays.

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

There are no commitments contained in this letter.

If you have any questions, please contact Robert B. Dickinson at (610) 718-3400.

Respectfully,

Richard W. Libra
Site Vice President – Limerick Generating Station
Exelon Generation Company, LLC

cc: Administrator Region I, USNRC
USNRC Senior Resident Inspector, LGS

NRC FORM 366 (01-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

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4. TITLE

Manual Actuation of the Reactor Protection System When Critical Due to Wiring Design Error

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
06	01	2016	2016	- 001	- 00	07	27	2016	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
100	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Robert B. Dickinson, Manager - Regulatory Assurance	610-718-3400

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	AD	P	G080	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

A manual actuation of the reactor protection system (RPS) when the reactor was critical was initiated during Plant Process Computer (PPC) modification testing at power. A modification wiring design error caused an actuation of both reactor recirculation pump (RRP) trip relays when a circuit isolation switch was closed. The direct cause of the event was a circuit wiring design error implemented in the field that caused energization of the RRP adjustable speed drive (ASD) trip coils. The root cause of the event was a failure of station personnel to appropriately apply Technical Human Performance (THU) error prevention techniques to identify the design error and prevent its installation and testing as part of the modification. The isolation switch for the mis-wired circuit was opened to enable reset of the ASD trip coils. The 2A and 2B ASDs were returned to service. The corrective actions are to change the circuit design to correct the design error. The human performance aspects of the event will be addressed through several management actions that include reinforcement of proper standards and behaviors related to THU error techniques with station personnel.

NARRATIVE

Unit Conditions Prior to the Event

Unit 2 was in Operational Condition (OPCON) 1 (Run) at approximately 100 percent power with PPC modification testing in progress. There were no structures, systems or components out of service that contributed to this event.

Description of the Event

On Wednesday, June 1, 2016, Limerick Unit 2 was operating at 100 percent power with PPC (EIIS:CPU) modification testing in progress. The modification testing directed closure of a circuit isolation switch which resulted in the trip of both RRPs (EIIS:P) due to an error in the modification wiring design. The control room supervisor (CRS) entered the procedure for an unexpected/unexplained change in core flow (OT-112) due to the trip of both RRPs. The procedure directed a manual actuation of RPS.

All control rods inserted and safety significant systems functioned as expected. Reactor level initially increased then decreased to approximately +0 inches which is less than the +12.5 inch low level setpoint for RPS. Level then stabilized at normal level. Nuclear Steam Supply Shutoff System Groups IIA and IIB isolations actuated on low level at +12.5 inches. The digital feedwater level control system functioned as designed. Reactor pressure vessel pressure was controlled by the main steam bypass valves.

The investigation of the event identified that a wiring design error caused an unplanned actuation of both RRP trip relays when a circuit isolation switch was closed as directed by the modification acceptance test procedure.

A four-hour ENS notification (#51968) was completed on Wednesday, June 1, 2016, at 1041 hours as required by 10CFR50.72(b)(2)(iv)(B) for an actuation of RPS when the reactor is critical. This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A) for a manual actuation of RPS.

Analysis of the Event

There was no actual safety consequence associated with this event. The potential safety consequences of this event were minimal. All control rods were verified to be fully inserted following the RPS actuation. The 2A RRP was restarted at 1548 hours on June 1, 2016 and the 2B RRP was restarted at 0326 hours on June 2, 2016.

The PPC replacement modification was in progress and computer input points were being transferred from the original computer to the new computer. When the second RRP related computer point was placed in service by closure of a circuit isolation switch both 2A and 2B RRP trip relays were energized due to an error in the wiring design.

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NARRATIVE

Cause of the Event

The direct cause of the event was a circuit wiring design error that was implemented in the field and caused energization of the RRP ASD trip coils.

The root cause of the event was a failure of station personnel to appropriately apply THU error prevention techniques to identify the design error and prevent its installation and testing as part of the modification.

Corrective Actions Completed

The isolation switch for the mis-wired circuit was opened to enable reset of the ASD trip coils.

The 2A and 2B ASDs were returned to service.

Corrective Actions Planned

The wiring design error will be corrected and the Modification Acceptance Test will be revised to ensure the change is correctly tested per the requirements of the Acceptance Test Criteria.

The human performance aspects of the event will be addressed through several management actions that include reinforcement of proper standards and behaviors related to THU error techniques with station personnel.

Previous Similar Occurrences

There was no previous RPS actuation in the past five years due to modification testing.

Component data

System:	AD	Reactor Recirculation System
Component:	P	Pump
Component number:	2A-P201-DR	
Component name:	Reactor Recirculation Pump	
Manufacturer:	G080	General Electric Company
Model number:	5K46385AA1	